

CLAIMS

What is claimed is:

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1. A system comprising:

a first tenant base station operated by a first wireless communication service provider;

a second tenant base station operated by a second wireless

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communication service provider, and co-located with the first base station;

a transport medium interface for converting radio frequency signals transmitted by the first and second base stations and control messages relating thereto to a common transport medium;

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a plurality of remotely located radio access nodes, each radio access node associated with a predetermined portion of a total system coverage area, and each radio access node coupled to receive signals from the common transport medium, with each radio access node containing at least a first and second tenant slice module associated with the respective first and second tenant base stations; and

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a first tenant network management system operated by the first wireless communication service provider;

a second tenant network management system operated by the second wireless communication service provider;

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a common network management system that forwards control messages from the respective tenant network management system to the intended tenant slice modules associated with respective ones of the radio access nodes using the shared transport medium.

2. A system as in claim 1 where in the common network management system additionally filters forwarded messages to limit access by tenants to status and control information associated only with radio access node equipment operated by other tenants.

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3. A system as in claim 2 wherein the common network management system further comprises:

10 a statefull firewall configured such that the common network management system appears to be an agent for interfaces of tenant network management systems, but appears as a client to open access system elements

4. A system as in claim 3 wherein the statefull firewall additionally comprises:

15 a management information block for maintaining configuration information that defines access privileges that a particular tenant client may have.

5. A system as in claim 1 wherein the common network management system additionally comprises:

20 a local database store containing information from poll and status information requests that the common network management system originates.

6. A system as in claim 5 wherein the common network management system additionally comprises:

25 a poll and status request message interceptor, which intercepts messages from the tenant network management systems intended for the radio access nodes and attempts to respond from information contained in the local database.

7. A method for providing multiple wireless communication service providers with access to radio equipment distributed throughout a coverage area, the method comprising the steps of:

5 accepting requests for distribution service from multiple tenant service providers, the requests specifying a desired air interface for wireless communication from among a plurality of available air interfaces, and an indication of which portions in the coverage area the particular air interface is to be supported;

10 providing communication network connections to network management system equipment for operating and controlling the base stations equipment as provided by the multiple tenant service providers;

15 15 a plurality of remotely located radio access nodes, each radio access node associated with a predetermined portion of a total system coverage area, and each radio access node coupled to receive signals from the common transport medium, with each radio access node containing at least a first and second tenant slice module associated with the respective first and second tenant service providers;

20 installing, at a central location, a common network management system for intercepting control message traffic from and to the network management systems operated by the multiple wireless service providers intended to control to radio access nodes, and routing such messages to a common control message handler.

25 8. A method as in claim 7 wherein the common control message handler is a shared transport medium over which control messages are routed to the radio access nodes.

9. A method as in claim 7 wherein the common control message handler is process comprising the steps of:

sending generic status query messages to the radio access nodes; storing, in a local information database, responses to the generic status query messages; and

in response to control message originating from one of the tenant network management systems, obtaining status information from the local database.

10. A system comprising:

a first tenant network access device specified by a first communication service provider;

a second tenant network access device specified by a second communication service provider;

a transport medium interface for converting radio frequency signals transmitted by the first and second base stations and control messages relating thereto to a common transport medium;

a plurality of remotely located network access nodes, each network access node associated with a predetermined portion of a total network system coverage area, and each network access node coupled to receive signals from the common transport medium, with each network access node containing at least a first and second tenant slice module associated with the respective first and second tenant networks; and

a first tenant network management system operated by the first communication service provider;

a second tenant network management system operated by the second communication service provider;

a common network management system that forwards control messages from the respective tenant network management system to the intended tenant slice modules associated with respective ones of the network access nodes using the shared transport medium.

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11. A system as in claim 10 where in the common network management system additionally filters forwarded messages to limit access by tenants to status and control information associated only with network access node equipment operated by other tenants.

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12. A system as in claim 10 wherein the common network management system further comprises:

a statefull firewall for filtering messages such that the common network management system appears to be an agent for interfaces of tenant network management systems, but appears as a client to open access system elements.

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13. A system as in claim 12 wherein the statefull firewall additionally comprises:

a local data store for maintaining configuration information that defines access privileges that a particular tenant client may have.

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14. A system as in claim 10 wherein the common network management system additionally comprises:

a local database for storing data taken from poll and status information requests originated by the common network management system.

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